REMARKS

The above claim amendments are submitted with the following remarks to be fully responsive to the Official Action dated March 8, 2005. It is further submitted that this response is timely filed within the three-month shortened-statutory period. Accordingly, no fee for an extension of time is believed necessary. Should any fee be required, the Commissioner is authorized to charge Kagan Binder Deposit Account No. 50-1775 and thereafter notify us of the same. Reconsideration of all outstanding grounds of the rejection and allowance of the subject application are believed in order and respectfully requested.

In the Official Action the Examiner objected to claims 22 and 29 because a unit of measure is not recited in these claims. By this amendment, claims 22 and 29 are amended to recite an appropriate unit of measure. Withdrawal of the objection is thus respectfully requested.

Claims 1, 17, and 24 are amended to recite "a gallium nitride based heterojunction field effect transistor device" in the preamble of each of these claims in order to more clearly characterize the type of device being claimed. In this regard, claims 1, 17, and 24 are amended to remove the limitation that the device of each of these claims is "configured to function as a heterojunction field effect transistor."

Applicant notes with appreciation the Examiner's early indication of allowable subject matter in dependent claims 10-15. As set forth below, Applicant believes that the presently pending claims as amended herein are patentable over the prior art of record. As such, the subject matter of claims 10-15 has not been presented in independent form at this time.

Claims 1-9 and 16-30 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,462,361 to Udagawa et al. in view of U.S. Publication No. 2003/178633A1 to Flynn et al. The Official Action essentially submits that it would be obvious to substitute the gallium nitride based layer structure of Flynn et al. for the gallium arsenide based superlattice in the device structure of the Udagawa et al. reference to arrive at the subject matter of the claimed invention. Applicant respectfully traverses the rejection on the basis that the proposed combination is improper and even if made does not lead to the presently claimed invention.

It is respectfully submitted that combining Udagawa et al. with Flynn et al. is improper, in that each reference is directed to such fundamentally different material systems that have distinct compatibility and functionality requirements it could not be obvious to substitute a gallium nitride layered structure (such as that of Flynn et al.) into the gallium arsenide material system of Udagawa et al. Gallium arsenide based material systems and gallium nitride based material systems are fundamentally distinct. There are significant and fundamental differences between these two material systems such as their respective crystal structures, band gaps, lattice constants, and band alignments, for example, that make any combination of the two unpredictable. Neither reference teaches or even suggests how these two different material systems could be combined in a way that would be successful. Udagawa et al. describes gallium arsenide based material systems and makes no mention or suggestion of gallium nitride based material systems while Flynn et al. describes gallium nitride based material systems and makes no mention or suggestion of gallium arsenide based material systems. This is because these material systems are recognized as distinct, mutually exclusive, and incompatible with each other.

In order to emphasize the distinction between gallium arsenide based material systems and gallium nitride based material systems, claims 1, 17, and 24 are amended to recite, "a *gallium nitride based* heterojunction field effect transistor device" in the preamble of each of these claims. In this regard, even if somehow the gallium nitride layered structure of Flynn et al. were substituted for the gallium arsenide superlattice of Udagawa et al., the combination does not provide the subject matter recited in claims 1, 17, and 24. Such combination only provides a gallium arsenide device structure with a gallium nitride based portion. The presently amended claims require a gallium nitride based device with a gallium nitride based superlattice.

Also, not only is there no suggestion to combine these material systems as explained above, there is no suggestion to use the sapphire substrate recited claim 17 or the silicon carbide substrate recited in claim 24 with the gallium arsenide based material system of Udagawa et al. These substrate materials are disclosed in Flynn et al. because they are specific to gallium nitride based material systems. There is no suggestion in either reference that these substrate materials would work with gallium arsenide based materials.

Additionally, Applicant respectfully submits that if the GaN/AlGaN portion of the layered structure of the device of Figure 3 of the Flynn et al. reference were positioned as a superlattice within a gallium nitride based device structure as recited in claims 1, 17, and 24, the resulting device could not be characterized as a heterojunction field effect transistor as presently claimed. More particularly, in Figure 3, Flynn et al. illustrates a layered structure having a GaN layer 14 and an AlGaN layer 16 that is divided into upper and lower portions by a silicon delta doped layer 18. The effect and purpose of the delta doped layer 18 is to make the layer 16 conducting. Providing a GaN/AlGaN superlattice with a silicon delta doped layer as taught by Flynn et al. in the position presently claimed i.e., between an upper and lower buffer region with a heterojunction region above, would be inconsistent with forming a functional transistor. This would result in a structure that has a buffer layer with a GaN/AlGaN superlattice having a silicon delta doped conducting layer and a heterojunction region positioned on the buffer layer. A heterojunction field effect transistor functions as a switch to turn on and off the flow of electrons through the device. The buffer layer portion of such a transistor is insulating because the operation of the device depends on field effect. If charge carriers are mobile anywhere other than the channel portion of the heterojunction region of the transistor, the electric field generated by the gate electrode is 1) screened by the carriers in the channel and 2) rolling off as $1/r^2$, where r is the distance to the "buried" carriers in delta doped layer of the conducting superlattice. The proposed combination would effectively create a device that no longer functions as a transistor that can turn the flow of electrons on and off.

Withdrawal of the rejection of independent claims 1, 17, and 24 is respectfully requested. Regarding dependent claims 2-9, 16, 18-23, and 25-30, withdrawal of the rejection of record of these claims is respectfully requested at least in that they further limit one of claims 1, 17, and 24. Allowance of claim 1-9 and 16-30 is respectfully requested.

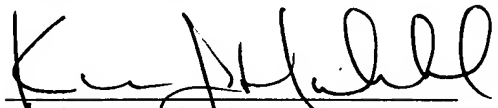
A Revocation of Power of Attorney With New Power of Attorney and Change of Correspondence Address is being filed concurrently, a copy of which is enclosed for the Examiner's convenience.

In view of the above remarks, it is respectfully submitted that the claims and the present application are now in condition for allowance, which allowance is earnestly

solicited. The Examiner is invited to contact the undersigned, at the Examiner's convenience, should the Examiner have any questions regarding this communication or the present patent application.

Dated: June 8, 2005

Respectfully Submitted,

By: 

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